



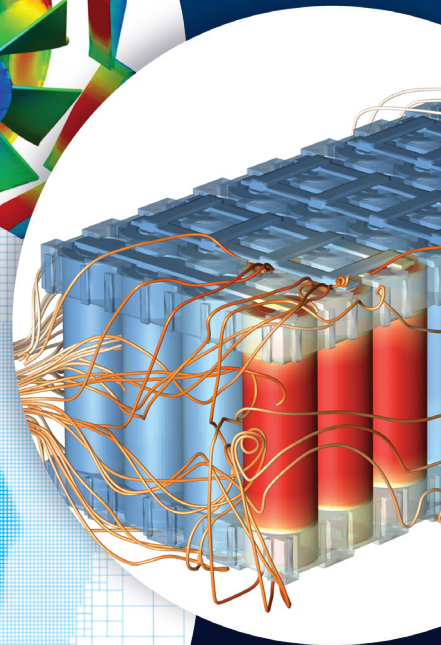
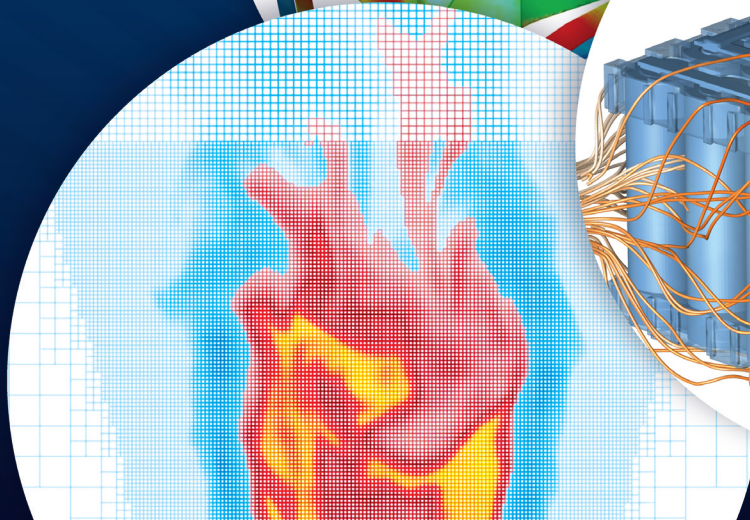
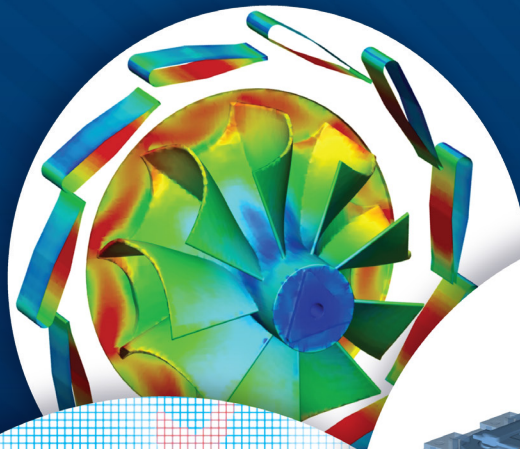
# CONVERGE

APPLICATION WORKSHOP

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## HYDROGEN

20 June 2022 | Politecnico di Torino-Torino, Italy



# WELCOME

Welcome to the inaugural 2022 CONVERGE Application Workshop! We're thrilled to be hosting this event in stunning and historic Torino, Italy.

For our first workshop, we're focusing on a topic integral to decarbonization: hydrogen modeling. Engineers around the globe are researching the potential of hydrogen to replace conventional carbon-based fuels. Simulation is a key enabler of this research, allowing engineers to investigate hydrogen-fueled engines and assess hydrogen safety and storage technology.

We're pleased to have prominent speakers with us today to share their expertise in designing hydrogen-fueled internal combustion and gas turbine engines. In addition, several of our own engineers are here to demonstrate the power of CONVERGE CFD software for hydrogen research.

We would like to thank our workshop sponsor, POWERTECH Engineering, as well as our colleagues at Politecnico di Torino for helping us orchestrate and host this event. On behalf of everyone at Convergent Science, thank you for attending the CONVERGE Application Workshop, and we hope you enjoy the day!



**Rainer Rothbauer**

Co-Owner & General Manager, *Convergent Science GmbH*



# FEATURED SPEAKERS



MIRKO BARATTA, PH.D.

Dr. Mirko Baratta is an associate professor of the Energy Department “Galileo Ferraris” at Politecnico di Torino. He earned his Ph.D. in energetics in 2004. Dr. Baratta’s research is focused on OD and 3D CFD modeling of internal combustion engines and gas turbines, with a particular emphasis on fuel injection, combustion, and turbocharging. Dr. Baratta was the scientific coordinator of the Gason project (H2020 program) for Politecnico di Torino, and he is currently responsible for a research contract on hydrogen combustion in gas turbines.



ANDREA BIANCO, M.SC.

Andrea Bianco is responsible for 3D CFD simulation projects and related R&D activities at POWERTECH Engineering. He earned an M.S. in automotive engineering from Politecnico di Torino in 2007. Prior to joining POWERTECH Engineering in 2015, he worked as a researcher at Fiat Research Center, Politecnico di Torino, and Johnson Electric. He has worked extensively on the development of innovative 3D CFD methodologies for combustion and pollutant formation, aftertreatment systems, multi-phase simulations, aeroacoustics, and thermal analysis of ICEs, EVs, and batteries.



ANDREA PIANO, PH.D.

Dr. Andrea Piano is a research assistant at Politecnico di Torino. In 2018, he earned his Ph.D. in energetics from Politecnico di Torino in collaboration with GM Global Propulsion Systems. His research has focused on internal combustion engines, starting with 1D CFD simulation and then moving to both experimental testing and 3D CFD analysis. He has co-authored a number of peer-reviewed journal articles and presented his work at several international technical conferences.

# SCHEDULE

- 09:00 **Registration Opens**
- 10:20 **Welcome** - Rainer Rothbauer | *Convergent Science*
- 10:30 **Synergetic Application of 0/1/3D-CFD Approaches for Hydrogen-Fuelled Spark Ignition Engine Simulation** - Andrea Bianco | *POWERTECH Engineering*
- 10:55 **Dual-Fuel H2-Diesel Combustion System Development for Off Highway Applications**  
Andrea Piano | *Politecnico di Torino*
- 11:20 **Simulations of Key Aspects for H2 Safety: Self-Ignition and DDT**  
Lorenzo Sufrà | *Convergent Science*
- 11:45 **CFD Simulations of Non-Premixed NG/H2 Combustion in Gas Turbines**  
Mirko Baratta | *Politecnico di Torino*
- 12:10 **Lunch**
- 13:40 **CFD's Role in Hydrogen Gas Turbine Development** - Luca Ferretti | *Convergent Science*
- 14:40 **Break**
- 15:10 **CFD Modelling for H2-DDT with CONVERGE** - Lorenzo Sufrà | *Convergent Science*
- 16:10 **Modelling H2 Combustion in IC Engines With CONVERGE** - Luca Ferretti | *Convergent Science*
- 17:10 **Closing**

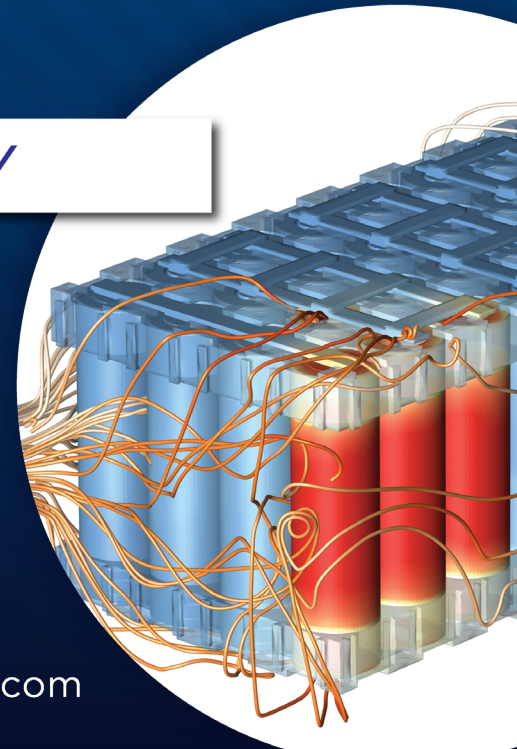
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# SPONSOR

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POWERTECH Engineering provides expert consulting services in both 1D engine simulation and computational fluid dynamics to help customers solve powertrain simulation problems, minimize development costs, and increase productivity.

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